Mathematical Reviews

Edited by

O. Neugebauer **M. H. Stone** **O. Veblen**

R. P. Boas, Jr., *Executive Editor*

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SUBJECT INDEX

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Potentials. Cf. Potential theory (special potentials).

Networks. Cf. Operational calculus; probability theory (technical applications).

Technical applications.

ELECTRON OPTICS. See: optics (electron optics).

ELEMENTARY DIVISORS. See: algebra: linear (characteristic values).

ELEMENTARY GEOMETRY. See: geometry (elementary).

ELIMINATION, THEORY OF. See: algebra: abstract; algebra: equations (systems); invariants (algebraic).

ELLIPTIC DIFFERENTIAL EQUATIONS. See: differential equations; electricity; functional analysis (existence theorems); harmonic functions; hydrodynamics; numerical methods (differential equations); potential theory.

ELLIPTIC FUNCTIONS AND RELATED TOPICS. Cf. Algebraic functions.

Elliptic functions and integrals.

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General abstract spaces. Cf. Differential geometry (Finsler spaces); functions of real variables (integration in abstract spaces); geometry (abstract metrics); sets; topology (topological spaces).

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Other special spaces. Cf. Functions of real variables (functions in abstract spaces).

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Equations in infinitely many variables. Cf. Differential equations (differential operators).

Existence theorems for differential, integral and functional equations; spectral theory.

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FUNCTIONAL SPACES. See: differential geometry (Finsler spaces); functional analysis; measure and integration; topology (topological spaces; applications).

FUNCTIONS OF COMPLEX VARIABLES. Cf. Algebraic functions; Dirichlet series; elliptic functions; Fourier integrals; integral transforms (Laplace integrals; Mellin transforms; self-reciprocal functions); harmonic functions; number theory (analytic tools).

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Zeros. Cf. Polynomials (zeros).

Analytic continuation, singularities, overconvergence.

Cauchy integral and related topics. Cf. Calculus (contour integrals).

Schwarz lemma, maximum principle, and related topics.

Conformal mapping: general theory.

Conformal mapping: special problems and applications. Cf. Calculus of variations (minimal surfaces); differential geometry.

Riemann surfaces, uniformization. Cf. Topology (covering surfaces).

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GAS DYNAMICS. See: hydrodynamics (perfect fluids: compressible).

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GEOELECTRICITY. See: geophysics (geoelectricity).

GEOMAGNETISM. See: geophysics (geoelectricity).

GEOMETRICAL OPTICS. See: optics (geometrical).

GEOMETRY. Cf. Algebraic geometry; calculus (applications to geometry); contact transformations; continuous geometry; convex bodies; descriptive geometry; differential geometry; groups (group-theoretical problems of geometry); isoperimetric problems; topology; trigonometry; vector and tensor calculus.

Foundations. Cf. Logic; philosophy.

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Triangles, tetrahedra, etc.

Geometry of the circle and sphere.

Theory of constructions.

Regular figures and divisions of space. Cf. Elliptic functions (modular groups); groups (crystallography).

Configurations.

Analytic geometry. Cf. Algebra: linear.

Projective geometry. Cf. Algebra: linear.

Geometry in fields.

Lines and higher space elements. Cf. Differential geometry (differential line geometry; Laguerre geometries; geometry of lineal elements).

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Minkowski geometry and other generalizations. Cf. Differential geometry (Finsler spaces).

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GEOMETRY OF NUMBERS. See: number theory (geometry of numbers).

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Potentials. Cf. Geodesy (higher).

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GRAPHICAL METHODS. See: numerical methods.

GRAPHS. See: mechanics (statics); topology (graphs).

GRAVITATION. See: astronomy (cosmology); geodesy (higher); geophysics (potentials); potential theory; relativity.

GREEN'S FUNCTIONS. See: differential equations; harmonic functions (Dirichlet problem); heat conduction.

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Finite groups.

Abstract groups in general.

Abelian groups.

Lattice and partially ordered groups. Cf. Partially ordered sets.

GROUPS. (Continued)

Representations, characters.

Continuous and topological groups. Cf. Contact transformations; differential equations (infinitesimal transformations); measure and integration (integration in abstract spaces).

Lie groups.

Crystallography and divisions of space. Cf. Geometry (regular figures).

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HARMONIC FUNCTIONS AND GENERALIZATIONS. Cf. Elasticity; hydrodynamics; potential theory.

General theory.

Subharmonic functions. Cf. Convex functions.

Dirichlet problem and other boundary value problems. Cf. Differential equations (boundary value problems).

HARMONIC FUNCTIONS AND GENERALIZATIONS. (Continued)

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Generalizations.

HEAT CONDUCTION. Cf. Differential equations; diffusion; probability (Markov chains).

HEAVISIDE CALCULUS. See: operational calculus.

HERMITE FORMS. See: algebra: linear (quadratic forms).

HERMITE POLYNOMIALS. See: interpolation; polynomials; special functions (hypergeometric functions).

HILBERT SPACES. See: differential geometry (Finsler spaces); functional analysis (Hilbert spaces); measure and integration; topology (topological spaces; applications).

HILBERT TRANSFORMS. See: Fourier series (conjugate functions); integral transforms (Hilbert transforms).

HISTORY.

Ancient and medieval mathematics.

Modern mathematics.

India, Far East, Maya.

Astronomy and physics.

Biography of

NUMBER THEORY. Cf. Continued fractions (number-theoretical applications); Diophantine approximations; tables (number-theoretical).

Elementary theory of numbers.

Congruences.

Diophantine equations and representation problems.

Geometry of numbers.

Divisibility and factorization problems.

Power residues and laws of reciprocity.

Algebraic number theory, number fields. Cf. Algebra: abstract (fields).

Class fields and class numbers. Cf. Algebra: abstract (Galois theory).

Theory of forms. Cf. Elliptic functions (automorphic functions; modular groups).

Fermat's last theorem.

NUMBER THEORY. (Continued)

Additive theory of numbers.

Waring problem.

Number-theoretical functions.

Theory of primes: distribution of primes. Cf. Dirichlet series (zeta functions).

Analytic theory of numbers in number fields and fields of functions. Cf. Elliptic functions.

Lattice points.

Analytical tools. Cf. Diophantine approximations (equidistribution problems); Dirichlet series; elliptic functions.

NUMERICAL AND GRAPHICAL METHODS. Cf. Tables.

Equations. Cf. Actuarial mathematics (mathematics of finance).

Systems of linear equations, determinants.

Differences, interpolation and graduation. Cf. Differences; errors; interpolation.

TRANSLITERATION OF RUSSIAN

The following system of transliterating Russian has been adopted by Mathematical Reviews for use beginning with volume 7.

а = a	л = l	ц = c
б = b	м = m	ч = č
в = v	н = n	ш = š
г = g	о = o	щ = šč
д = d	п = p	ъ = ″
е = e	р = r	ы = y
ж = ž	с = s	ь = ′
з = z	т = t	э = è
и = i	у = u	ю = yu
й = ĭ	ф = f	я = ya
к = k	х = h	

The system formerly used differed from this as follows: ĭ was j, h was ch or kh, ″ was ', ′ was j, è was e, yu was ju, ya was ja.

Whenever an author's name is transliterated in the journal in which his paper appears, Mathematical Reviews uses that transliteration.

ERRATA

Volume 1

P. 20: **Kampé de Fériet.**
In the title read **194** instead of **210**.

P. 124: **Buchanan.**
The paper was quoted from a reprint. The correct pagination is 239–248.

P. 247: **Potoček.**
The paper was quoted from a reprint. It actually appeared in vol. **40**, pp. 123–132.

P. 306: **Cooke.**
The author's middle initial is G. instead of H. It was misprinted in the original journal.

P. 366.
The entries under Jaeger should read as follows.

Volume 2

P. 13: **Amodeo** (second review).
The paper was quoted from a reprint. The correct pagination is 194–221.

Volume 3

P. 68: **Inaba.**
In the last reference read "L. Rédei and H. Reichardt" instead of "H. Reichardt."

Volume 4

P. 153: **Moran.**
In lines 7–11 on p. 154, replace the two sentences "Moran states . . . closed" by "Moran proves that the same inequality holds for any measurable set X for which A exists."
G. B. Price (Lawrence, Kan.).

P. 282: **Hall.**
The paper was quoted from a reprint. The correct pagination is 219–229.

Volume 5

P. 66: **Bellman.**
In the title read **49** instead of **42**.

P. 99: **Mackey.**
For errata to the review, see the review of another paper by the author, these Rev. **8**, 519.

P. 1[illegible]8: **Roure.**
In the title read 333 instead of 353.

Volume 6

P. 116: **Malcev.**
For errata to the review, see the review of a paper by Levitzki, these Rev. **8**, 435.

Volume 7

P. 513: **Tsuji.**
In the title read **17** instead of **14**.

Volume 8

P. 62: **Krasner.**
In line 9 of the review, read γ instead of x.

P. 63: **Kaplansky.**
Delete the last sentence. Cf. the review of a paper by Levitzki, these Rev. **8**, 435.

P. 73: **Petrov** (first review).
The author's first initial is B., not V. It was misprinted in the original journal.

P. 136: **Tricomi; Cherwell.**
The reviews should be interchanged; as printed, the title of Tricomi's paper is followed by the review of Cherwell's paper, and vice versa.

P. 139: **Rédei.**
In lines 3 and 9 of the review and in line 4 of the second column, read 8 instead of δ.

P. 145: **Biernacki.**
The inequality in line 11 of the review contradicts a result of J. E. Littlewood [Quart. J. Math., Oxford Ser. **9**, 14–20 (1938)]. There is an error in Biernacki's proof: on p. 209, line 16, the exponent $-1/n$ should read $-1/(nk)$. This vitiates Biernacki's argument.
W. Seidel (Rochester, N. Y.).

P. 148: **Wall** (third review).
Replace the last sentence by the following. For a bounded J-fraction there exists a smallest constant N such that

$$\left|\sum_{p=1}^{n} b_p u_p v_p - \sum_{p=1}^{n-1} a_p(u_p v_{p+1} + u_{p+1} v_p)\right| \leqq N\left\{\sum_{p=1}^{n} |u_p|^2 \cdot \sum_{p=1}^{n} |v_p|^2\right\}^{\frac{1}{2}}$$

for all $n \geqq 1$ and all u_p, v_p; N is called the norm of the J-fraction and $N \leqq M$. In this paper it is shown that there exists a convex set in $|z| \leqq N$ such that (1) converges for z outside this set.
W. J. Thron (St. Louis, Mo.).

P. 164: **de Mira Fernandes.**
The author's result, in a slightly more special form, was anticipated by Kakutani [Ann. of Math. (2) **43**, 739–741 (1942); these Rev. **4**, 111].
W. Fenchel (Copenhagen).

P. 189: **Hofmann** (third review).
In the title read 304 instead of 303.

P. 224: **Comessatti.**
The author's name is Comessatti, not Comessati.

P. 240: **Signorini** (first review).
In the title read Mat. instead of Math.

P. 255: **Walker.**
The reviewer regrets having made an erroneous criticism of the paper. The following changes should be made in the review.
In the first line of the review read "proves" instead of "states." In line 7 read $y_n(x_1) \leqq y_n(x_2)$ instead of $y_n(x_1) < y_n(x_2)$. Delete the second paragraph.
E. Hewitt (Chicago, Ill.).

P. 259: **Youngs.**
Replace the review by the following.
A technique recently used by T. Radó [Trans. Amer. Math. Soc. **58**, 420–454 (1945), in particular, pp. 425–427; these Rev. **7**, 282] is shown to yield the result that two mappings f_1 and f_2 of Peano spaces into the same

space are Fréchet equivalent if and only if they have monotone light factorizations $f_1 = lm_1$, $f_2 = lm_2$, with equal middle space, equal light factor l, and Fréchet equivalent monotone factors m_1 and m_2.

H. Federer (Providence, R. I.).

P. 262: **Loo.**

The results announced in the paper are proved in a paper reviewed earlier [Trans. Amer. Math. Soc. **56**, 508–518 (1944); these Rev. **6**, 126].

P. 278: **Fichera.**

The reviewer regrets having made an erroneous criticism of the papers under review. He stated erroneously that a theorem of Picone on the existence of extrema is false without additional hypotheses. This theorem is basic to the author's results. The next to the last sentence of the review should be deleted.

H. H. Goldstine (Princeton, N. J.).

P. 305: **Nallino.**

In the fourth line from the end of the review read "Evo" instead of "Ero."

P. 354: **Mathematical Tables Project.**

In the fifth line of the review, read (0.1) instead of (0.01).

P. 401: **Berzolari** (second title).

In the title read 401 instead of 402.

P. 448: **Obrechkoff** (first review).

In the first line, after $x<a$, add: "satisfying

$$\varphi^{(n)}(x) \leqq \psi^{(n)}(x)."$$

P. 456: **Karamata.**

In formula (1) for E_n read e_k instead of s_k.

P. 474: **Wishart.**

Add the following sentence.

The results for the z-distribution had been obtained previously by Aroian [Ann. Math. Statistics **12**, 429–448 (1941); these Rev. **3**, 175].

J. W. Tukey (Princeton, N. J.).

P. 493: **Hartree.**

The word "in" should be inserted after "such as" in line 5 of the second paragraph. The Harvard machine, although it has desirable automatic control features not possessed by the ENIAC, is much slower; the time required to multiply two ten-digit numbers on the ENIAC is only about three milliseconds as contrasted with about three seconds for the same multiplication on the Harvard machine.

P. W. Ketchum (Urbana, Ill.).

P. 588: **Taylor.**

In line 9 of the review read P_i instead of P_1.

P. 596: **Blumenthal.**

Replace the review by the following:

There is assumed a semimetric space of positive finite diameter d for which there is a real decreasing function $\varphi(pq/\rho)$ defined for each distance pq and for a fixed positive parameter ρ; further, $\varphi(0)=1$ and $\varphi(d/\rho)=-1$. For points $p_1, \cdots, p_m$ the symbol $\Delta_m(p_1, \cdots, p_m)$ denotes the determinant $|\varphi(p_ip_j/\rho)|$. A set of $m>0$ points is defined to be independent if $m=1$ or if $\Delta_m \neq 0$; otherwise dependent. The following five postulates are imposed. (I) There is a fixed natural number n such that every set of $n+2$ points is dependent. (II) There exists at least one independent set of $n+1$ points. (III) The determinant of each independent set of $m>1$ points is positive. (Given an independent set $p_1, \cdots, p_{k+1}$ of points, the set of all points p such that $\Delta_{k+2}(p_1, \cdots, p_{k+1}, p)=0$ is called a k-dimensional hypersphere.) (IV) If p_i, q_i $(i=1, \cdots, k+1)$ are two congruent sets of $k+1$ points (not necessarily distinct) of the k-dimensional hyperspheres S_k, S_k^*, respectively, such that $p_1, \cdots, p_{k+1} \approx q_1, \cdots, q_{k+1}$, then to each point p of S_k there corresponds at least one point q of S_k^* such that $p_1, \cdots, p_{k+1}, p \approx q_1, \cdots, q_{k+1}, q$. (V) If $p_1, \cdots, p_k$ are k independent points of S_n, then for each point p such that $p_1, \cdots, p_k, p$ are independent there exists at least one point q of S_k such that $p_1, \cdots, p_k, p \approx p_1, \cdots, p_k, q$. Any space in which postulates (I)–(V) is valid is called φ-spherical. After developing the geometry of spaces satisfying merely postulates (I)–(III), those properties of φ-spherical spaces needed to characterize this class among all semimetric spaces are obtained. The concluding section of the paper is devoted to imbedding problems.

J. L. Dorroh (Kingsville, Tex.).

[illegible]

[illegible] Fukien [illegible]

[illegible]

The results [illegible]

[illegible]

[illegible] Yukio [illegible]

[illegible]